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09/507,574	02/18/2000	Alex E. S. Green	GRE-100C2	9675

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EXAMINER	
LEUNG, JENNIFER A	
ART UNIT	PAPER NUMBER
1764	9

DATE MAILED: 08/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/507,574	Applicant(s) GREEN, ALEX E. S.	
	Examiner Jennifer A. Leung	Art Unit 1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 April 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *14 April 2003* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. Applicant's amendment submitted on April 14, 2003 has been received and carefully considered. The changes made to the Specification and Drawings are acceptable. Claims 25-36 have been cancelled. Claims 1-24 remain active.

Terminal Disclaimer

2. The terminal disclaimer filed on April 14, 2003 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of U.S. Patent 6,048,374 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Objections

3. Claims 5, 6 and 17 are objected to because of the following informalities:

- In claims 5 and 6, "C' and "F" should be changed to -- °C -- and -- °F --, respectively.
- In claim 17, -- tube -- should be inserted after "said reactor" for consistency in claim terminology.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 18, 19 and 21-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 18, "the feedstock residue" lacks proper positive antecedent basis.

Regarding claim 19, "the auger" lacks proper positive antecedent basis.

Regarding claim 21, the language of the claim is drawn to a method limitation, which renders the claim vague and indefinite, as it is unclear as to the structural limitation applicants are attempting to recite, since "the gas" is not considered an element of the apparatus.

Regarding claims 22 and 23, it is unclear as to the structural limitation applicants are attempting to recite, as the claims cover substantially identical subject matter, since the recitations of, "said device is useful for the pyrolysis of feedstock containing contaminants" and "said device is useful for phytomining" impart no additional structure to the claims, since the intended use of the apparatus is not an element of the apparatus. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

Regarding claim 24, "condensable gases" lacks proper positive antecedent basis.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 5, 6 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Tarman (U.S. 4,578,176).

Regarding claim 1, Tarman (FIG. 1; generally, column 4, line 45 to column 8, line 59) discloses a process for pyrolysis of feedstock, comprising the following steps:

introducing feedstock into a device **10** via a solids feeding means **20** and moving the feedstock through a reactor tube (comprising solids conduit **60**); and heating the feedstock within said reactor tube to a sufficient temperature such that pyrolysis occurs (column 5, lines 14-21);

wherein the feedstock is introduced into the reactor tube from an inner hopper (i.e., comprising solids preheat and pretreatment zone **I**) and gases of pyrolysis travel through the feedstock in the inner hopper **I**, the feed stock inherently acting as a filter, by virtue of the countercurrent gas-solid contact (column 6, lines 40-45; column 7, lines 30-50); and

wherein heat for heating the feedstock is generated by a heat source comprising, "hot particulates, hot gases or combustible materials for internal combustion within the heat addition zone" (column 8, lines 50-59).

Regarding claim 2, Tarman discloses the feedstock may comprise, "suitable solid organic carbonaceous material... selected from the group consisting of oil shale, coal, peat and biomass." (column 3, line 32 to column 4, line 44).

Regarding claim 3, the heat source of Tarman, comprising gases generated in the heat addition zone **III**, would inherently heat the feedstock within the reactor tube via the reactor tube wall (i.e., for solids conduit **60**), by virtue of the placement of the tube within the device.

Regarding claim 5, Tarman discloses a temperature range from about 1400 °F to about 2000 °F to achieve the production of gases (column 5, lines 14-21).

Regarding claim 6, Tarman discloses a temperature range from about 800 °F to about 1200 °F to achieve the production of liquids (column 5, lines 14-21).

Regarding claim 8, Tarman further discloses an exit orifice (i.e., defined by control valve **V6**, comprising a trickle valve, seal-pot valve or J-valve; column 7, lines 45-50), the feedstock entering a pressure vessel (i.e., defining regions **II**, **III** and **IV**) upon passing the exit orifice.

Instant claims 1-3, 5, 6 and 8 read on the method of Tarman.

6. Claims 16-18, 22 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Nathan et al. (U.S. 3,320,152).

Regarding claims 16 and 17, Nathan et al. (Figure) disclose a device comprising:

a reactor tube (standpipe **32**) and a means for moving feedstock through the reactor tube **32**, wherein the means comprises a rotating auger (i.e., rod **27**/bars **29** or other suitable agitation means such as a screw feeding means; column 5, lines 25-30);

a means for heating the feedstock within said reactor tube **32** to a sufficient temperature (i.e., via combustion; gases; particulate material; column 2, line 62 to column 3, line 47; column 6, lines 65-74; column 7, line 72 to column 8, line 2); and

an inner hopper (mixing vessel or feed preparation zone **14**), wherein the feedstock enters the reactor tube **32** from the inner hopper **14**, and wherein gases travel through the feedstock in the inner hopper **14** such that said feedstock inherently acts as a filter, by virtue of the countercurrent gas-solid flow (column 4, lines 53-60).

Regarding claim 18, Nathan et al. (Figure; column 5, lines 15-23) disclose reactor tube **32** comprising an exit orifice (base of **32**), the exit orifice communicating with pressure vessel **42**.

Regarding claims 22 and 23, Nathan et al. further disclose means (coking zone vessel **42**; Figure) for capturing the feedstock residue exiting the reactor tube **32**.

Instant claims 16-18, 22 and 23 structurally read on the apparatus of Nathan et al.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 4, 7 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tarman (U.S. 4,578,176).

Regarding claim 4, Tarman discloses feedstock being moved through reactor tube **60** via means of control valve **V6**, which may comprise a trickle valve, a seal-pot valve, or a J-valve (column 7, lines 45-50), but is silent as to whether the means may comprise a rotating auger. In any event, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to provide a rotating auger for the valve in the method of Tarman, since such means is well known in the art, and the rotating auger provides the substantially equivalent function of controlling the feedstock movement between two zones of the apparatus. Note that apparatus limitations, unless they affect the process in a manipulative sense, have little weight in process claims. *In re Tarczy-Hornoch* 158 USPQ 141, 150 (CCPA 1968); *In re Edwards* 128 USPQ 387 (CCPA 1961); *Stalego v. Heymes* 120 USPQ 473, 478 (CCPA 1959); *Ex parte Hart* 117 USPQ 193 (PO BdPatApp 1957); *In re Freeman* 44 USPQ 116 (CCPA 1940); *In re Sweeney* 72 USPQ 501 (CCPA 1947.

Regarding claim 7, although Tarman is silent as to whether the process may be conducted using a device comprising at least one additional reactor tube, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to provide at

least one additional reactor tube for conducting the method of Tarman, on the basis of suitability for the intended use (i.e., for increasing the throughput of feedstock), since the duplication of part was held to have been obvious. St. Regis Paper Co. v. Beemis Co. Inc. 193 USPQ 8, 11 (1977); In re Harza 124 USPQ 378 (CCPA 1960).

Regarding claims 13-15, Tarman discloses that for certain feedstock, "[t]he excess of the totals over 100 percent is thought to be due to weight gain by oxidation of metals in the mineral component during ashing," (column 4, lines 20-22), indicating that the process would be applicable to phytomining or the pyrolysis of feedstock comprising a contaminant, i.e., in this case, a metal contaminant. Although the specific metal contaminants are not disclosed by Tarman, one having ordinary skill in the art at the time the invention was made would recognize that the specific contaminant ultimately depends on the specific feedstock selected for pyrolysis.

8. Claims 9, 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tarman (U.S. 4,578,176) in view of Von Rosenberg, Jr. et al. (U.S. 4,278,446).

Regarding claims 9 and 10, Tarman is silent as to a step of injecting a gas into the reactor tube **60**. Von Rosenberg, Jr. et al. teach a process for the gasification of a feedstock, such as carbonaceous matter, wherein the feedstock is flowed through a reactor tube (comprising taphole **33**) and a hot combustion gas, comprising CO_2 and steam, is injected into the reactor tube. It would have been obvious for one of ordinary skill in the art at the time the invention was made to inject a gas into the reactor tube in the method of Tarman, "[i]n order to prevent freeze-up of slag in taphole **33**," as taught by Von Rosenberg, Jr. (column 8, lines 34-40; Fig. 2).

Regarding claim 12, although the collective teachings of Tarman and Von Rosenberg, Jr. et al. are silent as to the step of controlling the flow of the gas into the reactor tube, it would have

been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate flow rate for the gas into the reactor tube in order to achieve a desired conversion rate to gases and/or liquids in the modified method of Tarman, since the precise gas flow rate would have been considered a result effective variable, and it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller, 105 USPQ 233*.

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tarman (U.S. 4,578,176) in view of Nehls, Jr. (U.S. 5,354,345).

Regarding claim 11, Tarman is silent as an auger comprising a hollow shaft having at least one opening, wherein gases of pyrolysis are capable of exiting through the hollow shaft. Nehls, Jr. (FIG. 8; column 32, line 16 to column 35, line 5) teach a process for pyrolyzing a feedstock, wherein the process is conducted with an auger **412** having a hollow shaft **415**, wherein gases are capable of being injected into the downstream end of the auger via ports **455** for transport to the upstream end of the auger via egress ports **457**. It would have been obvious for one of ordinary skill in the art at the time the invention was made to utilize a hollow shaft having at least one opening in the method of Tarman, because the provision of such means would further regulate the fluid levels between the two zones (i.e., feed preparation zone **14** and coking zone **42**) of the apparatus, as taught by Nehls, Jr. (column 34, lines 3-13).

10. Claims 19 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nathan et al. (U.S. 3,320,152) in view of Nehls, Jr. (U.S. 5,354,345).

Regarding claims 19 and 24, Nathan et al. disclose that pyrolysis gases removed from vessel **14** via conduit **38** are condensed in an external condenser liquid separator **127** (Figure).

However, Nathan et al. are silent as to whether auger **27/29** may comprise a hollow shaft having at least one opening, or specifically means whereby a portion of the pyrolysis or external gases may be injected into a lower end of the shaft to hasten transport of the gases to condenser/ separator **127**. Nehls, Jr. (FIG. 8; column 32, line 16 to column 35, line 5) teach an apparatus comprising an auger **412** having a hollow shaft **415**, wherein gases would be capable of being injected into the downstream end via ports **455** for transport to the upstream end via egress ports **457**. It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a hollow shaft having at least one opening for the auger shaft in the apparatus of Nathan et al., on the basis of suitability for the intended use, because the provision of such means further regulates the fluid levels between the two zones (i.e., feed preparation zone **14** and coking zone **42**) of the apparatus, as taught by Nehls, Jr. (column 34, lines 3-13).

11. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nathan et al. (U.S. 3,320,152) in view of Von Rosenberg, Jr. et al. (U.S. 4,278,446).

Regarding claims 20 and 21, Nathan et al. are silent as to whether the apparatus may further comprise a means for injecting a gas into the exit orifice of the reactor tube **32**. Von Rosenberg, Jr. et al. teach an apparatus for the gasification of a feedstock, the apparatus comprising a reactor tube (comprising taphole **33**) and a means for injecting a hot combustion gas comprising CO_2 and steam into the reactor tube. It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide such means to the apparatus of Nathan et al., on the basis of suitability for the intended use, "[i]n order to prevent freeze-up of slag in taphole **33**," as taught by Von Rosenberg, Jr. (column 8, lines 34-40; Fig. 2).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is 703-305-4951. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jennifer A. Leung
August 9, 2003

Hien Tran

HIEN TRAN
PRIMARY EXAMINER